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EDITORIAL.

WE OBSERVE with pleasure the undertaking of the Commissioner of Education to collect and publish statistics and extended information regarding the teaching of biology in the colleges and universities of the United States. We have reached a time when we may well take a survey of what has been accomplished as an incentive to the furthering of work in this line. The forthcoming report will show a very rapid extension of laboratory work in the past years, and it will bring to notice some of the inequalities in the distribution of biological instruction, which it will be well for the colleges interested to correct. It will show, for example, that one of the foremost of our universities has two unusually able men teaching zoology, and practically no botanical instruction. It will show that another with a wide reputation has the same weakness. It will show that the instruction in botany in many of the colleges is yet of the high school grade, recognizing the existence of no plants but the Phanerogams. It will show that some of our oldest institutions have been the slowest to recognize the necessity of adopting the laboratory method of instruction. In many other directions we think that this report will prove both instructive and suggestive to biologists and college presidents.

STRANGE as it may seem, many of the alterations in college courses are due not so much to the conviction of the faculty that the change is a desirable one *per se,* as to the conviction that it is necessary in order to compete successfully with other institutions. Some leaders there must be in every reform, and many followers. Statistics in regard to botanical instruction at the present time will prove to even the most conservative college president or faculty that it is imperatively necessary to recognize the science of botany in the curriculum as of equal importance with chemistry and physics, if a college is to offer any choice of work to its students, or if it is to compete on equal terms with others on which it perchance looks down. Speed the day when we shall see *thorough instruction* in the science whose interests the GAZETTE strives to promote. Speed the day when we shall see *general instruction* in the science whose interests the GAZETTE strives to promote. Speed the day when we shall see *opportunity for research* in the hands of the teachers and richer *endowment of research* in the science whose interests the GAZETTE strives to promote.

CURRENT LITERATURE.

Australian plants.

BARON MUELLER has just issued the first part of his second systematic census of Australian plants, containing Phanerogams and Pteridophytes. It is a volume of nearly 250 large pages, and in addition to being a catalogue it contains chronological, literary, and geographical annotations. It is a work of vast labor, presenting in compact shape the known flora of a continent, its distribution, its relation to other continents, and a key to its literature. It enumerates 156 families, 1,409 genera, and 8,839 species. Of this number 7,501 are endemic in continental Australia and Tasmania, a tremendous proof of long isolation. Only about 15 per cent., therefore, extend to other countries. Of these 1,338 species in common with the rest of the world 160 are found in Europe, 1,032 in Asia, 515 in Africa, 315 in America, 558 in Polynesia, and 291 in New Zealand. Immigrated plants are entirely excluded from the enumeration. The 10 predominant orders are as follows: Leguminosæ (1,065 species), Myrtaceæ (663), Proteaceæ (597), Compositæ (539), Cyperaceæ (380), Gramineæ (345), Epacrideæ (275), Orchideæ (271), Euphorbiaceæ (224), Goodeniaceæ (220). The Filices follow close after with 212 species. Families prominent with us, but poorly represented in Australia, are as follows: Cornaceæ (1 species), Hypericaceæ (2), Hydrophyllaceæ (2), Caprifoliaceæ (2), Cupuliferæ (4), Onagraceæ (5), Primulaceæ (6), Ericaceæ (6). Of our great families Rosaceæ and Ranunculaceæ there are but 17 species each· Altogether it is a most interesting and compact showing of Australian botany.

Contributions from the National Herbarium.

It is a matter worthy of prominent mention that the National Herbarium has begun the publication of a series of botanical contributions These contributions are the natural outcome of the vast amount of material brought together under the direction of Dr. George Vasey. American botanists are greatly indebted to Dr. Vasey for the development of such an herbarium, and now still more so that he has organized a series of publications that will present to botanists information concerning the new and interesting plants of our domain. We give this enterprise our warmest commendation, and would express the hope that it will include not only the publication of interesting collections, but also monographs of plant groups. The first number has just appeared (dated June 13, 1890), and is devoted chiefly to the collections made in 1889, in lower California, by Dr. Edward Palmer, one of our very best collectors. A list of 224 species is first given, being plants collected by Dr. Palmer, in 1888, in southern California. The collections of 1889, in lower California, are published under five heads, as follows: Lagoon Head (50 species, three of which are new); Cedros Island (97 species, including four new ones); San Benito Island (17 species); Guadalupe Island (63 species, four of which are new); Head of the Gulf of California (18 species).

In many cases critical notes accompany the species. The work seems to have been committed chiefly to Mr. Rose (to whom are credited all the new species excepting one by Dr. Millspaugh), under the supervision of Dr. Vasey, and assisted by Mr. F. V. Coville in his special groups. The botanists of the National Herbarium are to be congratulated upon the fine showing they have made in the initial number of their new departure.

Diseases of plants.

The general interest in the subject of the specific diseases of plants and of their treatment has grown much faster than has a corresponding literature. The Germans have a few good general treatises on plant pathology, both technical and non-technical, but in English the publication of such works has barely begun. Smith's "Diseases of Field Crops," which appeared some time ago, is in many respects excellent, but contains paragraphs and almost whole chapters of controversial matters neither interesting nor edifying to the general reader. This was the first general work on plant diseases in the English language; the second one[1] has just appeared. It reminds one of its predecessors in the make-up of the volume, but not at all in the manner of treating the subject. The author, Professor Ward, is known to American botanists not only by his able investigations, but also by the admirable diction of his scientific articles. The present work is in a line with his other writings, and is to be commended for the careful arrangement of the subject and its clear and trustworthy treatment. It is intended as an introduction to the subject for non-technical readers. The book opens with a happy discussion of the meaning of disease in plants, and then proceeds to the consideration of a few common diseases, such as "damping off" of seedlings, club root of cabbage, potato rot, wheat and oat smut, ergot of rye, bladder-plums hop mildew and wheat rust. The very simple and accurate treatment of these topics should make the book a popular one with the class of readers it is designed to reach.

Minor Notices.

BY THE American student of lichens, at least, the issuing of a synopsis of the difficult genus Arthonia by Mr. Henry Willey will be gladly received. He enumerates 348 species, a half dozen or more of which are new ones. He also excludes more than 30 species which have been wrongly referred to the genus. There are quite a number of Cuban specimens which he proposes as new but does not name. The reason assigned is the fragmentary material, and that Dr. Müller has had the same collections and has possibly named them already. Mr. Willey has dealt with the synonomy as fully as could be done without studying the herbaria of Europe. His arrangement of species is an artificial one, but with the key it will afford great assistance in determining the species. The synopsis can be obtained from the author, at New Bedford, Mass., for $1.50.

MR. W. C. STURGIS has carefully studied a number of lichens most closely allied to the Collemaceæ with a view to determining whether at any time two separate systems of hyphæ exist in the fruit, the one giving rise to the asci and the other to the paraphyses, and whether any form of sexual reproduction could be found. Having found the asci and paraphyses in all cases arising together, and discovering no trace of sexual reproduction, he was led to re-examine some of the Collemaceæ with a view to establishing or disproving Stahl's well-known conclusions. His investigations were entirely confirmatory of Stahl's. It appears, therefore, that we have among the homœomeric lichens two types of sexual reproduction, while among the heteromeric species the reproduction is purely vegetative, as it is in some ascomycetous fungi.[2]

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[1] Ward, H. Marshall. Diseases of Plants, p. 196. 53 illust., 12mo. London: Soc. for Prom. Christian Knowledge. [1889.] 2s. 6d.

THE PAPER by Mr. Setchell on the structure and development of Tuomeya fluviatilis[3] very aptly supplements the recent monograph of Professor Atkinson on the Lemaneaceæ since the very thorough examination to which the author has subjected it shows clearly how closely it unites Lemanea and Batrachospermum.

THE EARLY stages in the germination of the macrospore of Isoetes echinospora show a remarkable similarity to the formation of the endosperm in the conifers, since the nucleus divides into a large number of daughter nuclei before any cell walls are apparent. Such is the substance of a brief article by Professor Douglas H. Campbell in the Berichte der Deutschen bot. Gesells. viii. pp. 97–100, pl. 1.

MR. F. H. KNOWLTON has just issued a revision of the genus Araucarioxylon of Kraus. The discussion involves the presentation of three genera, Cordaites (11 sp.),, Dadoxylon (26 sp.), and Araucarioxylon (13 sp.)

DR. GEORGE WALTER has carefully examined the brown sclerotic elements among the parenchymatous tissues of the rhizomes of a large number of ferns. Particular attention was given to the isolated groups and strands of cells designated by Russow as "Stützbündel." Dr. Walter has studied the development of the cell-groups, the thickening of the walls and the character of the coloring material which gives them their dark brown or almost black color. These coloring matters are phlobaphens, and begin to be deposited as the tissues have lost their power of division. The extraordinary hardness of this tissue is also due to these substances, which are either chemically united with the cellulose or infiltrated. The many interesting details must be sought in the memoir itself, which appears as one of the parts of the Bibliotheca Botanica.[4]

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[2] STURGIS, WILLIAM C.—On the carpologic structure and development of the Collemaceæ and allied groups. Contrib. from the Crypt. Lab. of Harvard University, XI. Reprinted from the Proc. Amer. Acad. of Arts and Sci. Vol. xxv, pp. 15-52, pl. 8. 8vo. May, 1890.

[3] SETCHELL, WILLIAM ALBERT.—Concerning the structure and development of Tuomeya fluviatilis, Harvey. Contrib. from the Crypt. Lab. of Harvard University, XII. Reprinted from Proc. Am. Acad. Arts and Sci. pp. 53-68. 1 double plate. May, 1890.

[4] WALTER, DR. GEORGE.—Ueber die braunwandigen, sklerotischen Gewebeelemente der Farne, mit besonderer Berücksichtigung der sog. "Stützbündel" Russow's. Bibl. bot. heft 18. pp. 21. pl. 3. 4to. Cassell: Theodor Fischer. M. 6.